

# Initial Flight Testing of a UAT ADS-B Transmitter Prototype for Commercial Space Transportation Using a High Altitude Balloon

## Problem Statement

- ADS-B technology such as the MITRE UBR-TX have great potential for tracking assets in commercial space transportation.
- The UBR-ERAU is a prototype based upon the UBR-TX that utilizes an unrestricted GPS to support operations in excess of current ITAR/COCOM velocity and altitude limits.
- This proposal seeks flight opportunities to test and refine this prototype.

## Technology Development Team

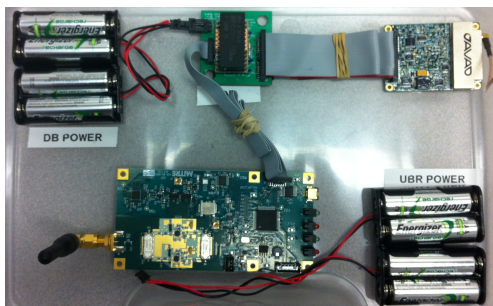
- Richard S. Stansbury, Embry-Riddle Aeronautical University, [stansbur@erau.edu](mailto:stansbur@erau.edu), PI
- Nick Demidovich, FAA Commercial Space Transportation (AST), [nickolas.Demidovich@faa.gov](mailto:nickolas.Demidovich@faa.gov)
- Partner organizations:
  - ERAU
  - FAA
  - MITRE

## Experiment Readiness:

- Initial balloon flight proposed
- Components utilized have existing flight history
  - UBR-TX: high altitude balloons and sounding rockets
  - Javad TR-G2 GPS: NASA KSC tested
- Key components replaced with mil-spec equivalents.

## Test Vehicles:

- This proposal requests operation on the Near Space Corporation's Nano Balloon System (NBS).



## Test Environment:

- The UBR-TX, the basis for this prototype, has flown on a number of rocket flights.
- Proposal requests operation on NSC's NBS
  - Altitude > 105,000 ft.
  - Duration up to four hours
  - Exposure to near-space environment

## Technology Maturation

- Component technologies vary in maturity
  - UBR-TX, TRL 6
  - Javad TR-G2, TRL 6
  - Antennas, TRL 4+
  - Daughterboard, TRL 3
  - Firmware, TRL 3
- Local dynamic tests shall validate integrated system to TRL 4.
- NBS Flight will provide necessary validation to raise readiness from TRL 4 to TRL 5 or 6 (field demonstrated prototype)

## Objective of Proposed Experiment

- The objective of the proposed flight opportunity is to create a path through empirical analysis to mature the UBR-ERAU prototype toward a design that can be utilized by NASA, FAA, and commercial space transportation providers such as Virgin Galactic to support asset tracking and better airspace integration.

This effort addresses Technology Area 13-26: "Tracking, Surveillance, and Flight Safety Technologies"